

**ABSTRACT**

A semiconductor package substrate has top and bottom surface buildup layers disposed on a thermally conductive substrate core. A portion of the substrate core may be exposed at a top surface of the package substrate to allow a heat spreader to be thermally coupled to the substrate core. An integrated circuit may be mounted on a top surface of the package substrate, with a top surface of the integrated circuit facing down. A heat spreader may be attached to the package substrate. The heat spreader may be thermally coupled to the substrate core and to a backside surface of the integrated circuit.